REMARKS/ARGUMENTS

The specification has been revised as suggested by the Examiner. Claims 54-86 are pending. New independent Claim 54 finds support in original Claim 1. The term "unmarked" finds support on page 18, lines 1-3 and in Example 3 (see comments below). The terms probe and pump beams are described in the specification on page 8, line 18 and page 9, lines 3-6. Claims 55-86 find support in the disclosure as follows: Claims 55-58 (page 16, lines 6-10), Claims 59-66 (Claim 1, page 7, lines 6-29), Claims 67-68 (page 10, lines 10-12), Claims 69-70 (page 10, lines 23-24), Claim 71 (page 11, line 11), Claim 72 (page 11, lines 5-6), Claim 73 (page 11, last line), Claim 74-75 (page 12, lines 2-3), Claim 76-77 (page 11, line 19), Claims 78-79 (page 12, line 19), Claim 80 (page 14, line 17), Claim 81 (page 10, line 26), Claim 82 (pages 14-15, bridging paragraph) and Claims 83-86 (Claim 4, page 16, lines 6-18). Accordingly, the Applicants do not believe that any new matter has been added. Favorable consideration and allowance of this application is respectfully requested.

Objection – Specification

These objections are moot in view of the amendments above.

Rejection – 35 U.S.C. § 112, Second Paragraph

Claims 14-53 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. These rejections are moot in view of the cancellation of these claims. They would not apply to the present claims for the following reasons:

A) Claims 14-53 were deemed indefinite for use of the phrase "said nitrogenous base(s)". The term nitrogenous base refers to a nucleoside.

B) Claims 14-53 were deemed indefinite for use of the phrase "without marking by a mirage effect method". The term "marking" is described on page 18, line 3 of the specification. Mirage-effect methods in which the oligonucleotides are not marked are exemplified in Example 3 of the specification. While prior art methods involve using marked probes (specification, page 4, line 27), the present inventors have discovered that the oligonucleotides synthesized on a surface may be characterized directly using the mirage effect without such marked probes.

The term "mirage effect method" is not used in the present claims.

C) Claims 14, 17, 20, 23, 26-34 and 37 were deemed indefinite for use of the word "characterizing". This term refers to identifying and analyzing the molecule(s), for example, by verifying the sequence, density or uniformity of a nucleic acid synthesized on a support, see page 6, lines 3-11.

D) Claims 15, 18, 21, 24, 35, 38, 40, 42, 44, 46, 48, 50, and 52 were deemed indefinite for use of the word "quantification". As indicated in the specification on page 3, lines 28-31 the term "quantification" refers to the determination of the amount or concentration of a compound, page 18, first paragraph and examples.

E) Claims 16, 19, 22, 25, 36, 39, 41, 43, 45, 47, 49, 51, and 53 were deemed indefinite for use of the word "mapping". The term "mapping" is used to refer to the location of a nitrogenous base (alone or in a nucleic acid) fixed on a support, see page 17, last paragraph and the examples in the specification.

F) Claims 17-19, 23-25, and 37 were deemed indefinite for use of the phrase "formed particularly of a support". This rejection is moot.

G) Claims 20-33 were deemed indefinite for use of the phrase "photothermal deflection method". This rejection is moot.

H) Claims 26-33 were deemed indefinite for use of the phrase "the image effect method". This rejection is moot.

I) Claims 27, 28, 20, 32, 40 and 41 were deemed indefinite for use of the word "coherent light". See the specification page 10, line 20 to page 11, line 2 for the definition of "coherent light" and "incoherent light".

J) Claims 34-37 were deemed indefinite for use of the phrase "polarization of the nucleic acid". The new claims do not use this phrase, however, Claim 80 refers to P-polarization and this term is described in the paragraph bridging pages 14-15 of the specification.

K) Claims 52 and 53 were deemed indefinite for use of the phrase "incoherent source". Please see the specification page 10, line 20 to page 11, line 2.

In view of the above, the Applicants submit that the claims when read in light of the specification clearly describe the invention and respectfully submit that these rejections would not apply to the present claims.

Rejection – 35 U.S.C. § 102

Claims 14-53 were rejected under 35 U.S.C. § 102(b) as being anticipated by Adelhelm et al., SPIE 2629:325-332. Adelhelm cannot anticipate the present invention because it does not disclose or suggest a process for characterizing, quantifying or mapping a nitrogenous base, a nucleic acid or a nitrogenous base of a nucleic acid by the photothermal method ("mirage effect method") without using any marker.

Unlike the invention, the Adelhelm process requires a marker, i.e., an intercalating dye like ethidium bromide, see e.g., Abstract ("DNA/intercalator-samples"), page 328, line 1 after Fig. 4 ("As a representative probe systems we studied complex formations of pUC19- and pBR322-plasmid DNA with intercalating dyes like ethidium bromide") and page 332,

Conclusion ("choice of more suitable dye molecules"). In the Adelhelm method the photothermal effect is produced by the strong light absorbing properties of the dye molecule wheren intercalated within DNA, see page 1, last two lines and page 2, first paragraph. Adelhelm used intercalting dyes, which is consistent with the description on page 8, lines 8-9, of the specification which indicates that "thin nucleic acid layers are usually considered as being non absorbent". Despite this known problem, the present inventors developed the method of the present invention which ingeniously avoids the necessity of marking of "non absorbent" oligonucleotides.

In contrast to dye-based methods, the "process according to the invention has the advantage that it does not necessitate any marking step or marker" (specification, page 18, lines 1-3). This process measures "the absorption, deviation or reflection of light originating from the excitation source *by the nucleic acid or by the nitrogenous base*" (specification, page 9, lines 25-27). The marker-free process of the present invention is exemplified in Example 3 on pages 26-27 of the specification. In Example 3, signals from a monomer (1T), dimer (2T) or octomer (8T) were measured (see Table 1). Fig. 9 shows the variation in photothermal signals produced by scanning the different samples: 1T, 2T and 8T. In view of this significant difference between the prior art process which uses a dye, and the marker-free process of the invention, the Applicants respectfully request that this rejection now be withdrawn.

Rejection – Provisional Double Patenting

Claims 14-53 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 14-39 for co-pending application no. 10/089,164. The Applicants respectfully request that this provisional rejection be held in abeyance until the identification of otherwise allowable subject matter. It

is understood that this provisional rejection will be dropped if the present application is allowed before 10/089,164, see MPEP 822.01.

Conclusion

In view of the above amendments and remarks the Applicants respectfully submit that this application is now in condition for allowance. Early notification to that effect is earnestly solicited.

Respectfully submitted,

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